

COVER OR WALL PROFILE

Cross-Referenced to Related Application

[0001] This application claims the benefit of provisional application 60/459,815, filed April 2, 2003, which is relied on and incorporated herein by reference.

Introduction and Background

[0002] The invention relates to a cover or cladding profile or section system for forming a variety of structures such as a floor surface or a wall surface or a wall.

[0003] Known cover profile systems comprise elongated elements, at first only in the form of solid wooden boards, but later on also in the form of hollow profiles from other materials. Wood, wood fibre/thermoplastic composites, wood fibre/thermoset composites, synthetic material, metal, and stony materials, are examples of currently used materials.

[0004] In an embodiment of such known systems, the boards or profiles are provided with a tongue and groove for fitting them into each other, wherein the tongue is provided with holes for passing an attachment means through, such as a nail or screw.

[0005] Although a cover having a closed look can be obtained with the known boards or profiles, the attachment holes form a point of leakage through which water is able to penetrate the construction parts lying below or behind them or the underlying space. An example of this is a cover arranged on a wooden balcony, wherein water is able to seep down between

the boards or profiles, through the balcony to the residence or parking space situated below it.

[0006] It is an object of the invention to improve on this.

Summary of the Invention

[0007] In one aspect the invention provides a cover profile system for forming a walking surface, roof surface, wall surface or wall, or the like, comprising a plurality of flat, elongated hollow profile bodies, also called panels herein, each comprising a first wall, a second wall, a first longitudinal edge and a second longitudinal edge, wherein the first longitudinal edge is provided with a first longitudinal strip having holes for attachment to an underlying base, wherein the second longitudinal edge is provided with a space for accommodating an edge area of the first longitudinal strip of a matingly engaged profile body, wherein one of either longitudinal edges is provided with a second longitudinal strip, which at the side of the first strip that faces the first wall, extends over the first strip to at least at an opposite longitudinal wall of the opposite longitudinal edge. In case the profile is to be used in a horizontal position, such as for providing a tread surface, the first wall is an upper wall and the second wall is a lower wall. In case the profile is to be used in a vertical position, such as in a cladding or as a wall, the first wall is an outer wall and the second wall is an inner wall.

[0008] Due to the arrangement of the second longitudinal strip extending over the first strip of an adjacent profile into or in abutment against an imaginary longitudinal plane in the longitudinal wall of the adjacent profile that is perpendicular to the first and second wall, this results in covering of the first strip provided with the attachment holes. This arrangement of parts largely prevents water from entering the attachment holes so that the underlying construction space is kept free from the leakage of water. Furthermore, it prevents dirt from entering and accumulating there,

which would affect the construction parts. The area of the attachment holes and attachment means is furthermore hidden from sight. Preferably, the second longitudinal strip extends over the first strip of the adjacent profile beyond or in the opposite longitudinal wall, as a result of which leakage along the edge of the second longitudinal strip is prevented. In addition, such a profile has improved heat-insulation properties.

[0009] Preferably the opposite longitudinal wall is provided with a first opening for accommodating the second longitudinal strip of an adjacent profile, which further improves the shielding of the attachment holes. The first opening extends about the second longitudinal strip preferably with little play that allows an ingoing and outgoing motion. A relative expanding motion between both adjacent cover profiles is thus made possible, in a direction transverse to the direction of the longitudinal edges, in a plane parallel to the first and second walls.

[0010] In order to prevent moisture transport from the first opening along the bottom of the second longitudinal strip to the area above the first strip, the second longitudinal strip may abut on a lowermost boundary of the opening.

[0011] Preferably the first opening is arranged in a first substantially raised longitudinal wall. The opening may inwardly open here into a first longitudinal chamber, that may be tight fitting or widened, particularly widened in downward direction.

[0012] In a first further embodiment thereof the first longitudinal chamber is bounded by an inwardly recessed portion of the first longitudinal wall. Thus the first longitudinal wall will continue to form a unity with the first and second walls, which is advantageous to the stability and the manufacturing process.

[0013] When the first opening ends in a first longitudinal chamber bounded by a first partition extending between the first wall and the second wall, said longitudinal chamber can be used for discharge therein of water discharged from the second longitudinal strip of an adjacent profile, when the latter is not throughout tight fitting in the second opening.

[0014] Preferably, the second longitudinal strip is formed at the second longitudinal edge, which results in a system having two longitudinal strips positioned above one another, but oriented in opposite directions, which further improves the shielding of the attachment holes.

[0015] In a further development of the system according to the invention the space for accommodating the first longitudinal strip is formed by a second opening in the adjacent profile. The second opening is defined by a groove formed in the second longitudinal edge, which groove is bounded by groove walls. Preferably the first longitudinal strip is provided with a first stop for stopping against a second stop on at least one of the groove walls of the adjacent profile, due to which the degree of penetration of the first longitudinal strip or tongue in the groove is limited. A correct positioning of the profile bodies is thus facilitated.

[0016] Preferably the other groove wall is provided with a first offset portion situated opposite the second stop, wherein the groove has a width corresponding to the thickness of the first longitudinal strip, wherein the first longitudinal strip at the side that faces away from the first stop is provided with a second offset portion which in height corresponds to the first stop. The second offset portion is situated offset with respect to the first stop in a direction towards the centre of the profile, wherein the depth of the groove is smaller than the distance from the first stop to the end of the first longitudinal strip. On the one hand a stop is thus obtained when the profile

body is put in place, whereas on the other hand, should deformations/expansions in the construction necessitate such, the first longitudinal strip is permitted to slide deeper into the groove and high tensions in the cover are thereby prevented.

[0017] Preferably the second longitudinal strip extends in line with the uppermost groove wall.

[0018] Insertion of the first longitudinal strip into the groove of an adjacent panel is enhanced when the first longitudinal strip is provided with a pilot edge at the side that faces the bottom side.

[0019] For enhancing the discharge of intercepted water it is preferred that the first and second longitudinal edge together with the second longitudinal strip form a upwardly opening channel.

[0020] For increasing the rigidity of the profile bodies it is furthermore preferred that between the first wall and the second wall a number of partitions are formed for defining a number of longitudinal chambers. This also improves the heat-insulation properties.

[0021] In a further development of the profile system according to the invention the first wall has a flat top surface which preferably is provided with an integrally formed texture. This texture can not only offer improved grip to the user's feet, but also can provide a woody look. In one embodiment, the texture comprises a number of parallel oriented longitudinal grooves, for instance having a depth in the order of one or several mm. Additionally or alternatively the texture may comprise small fine longitudinal grooves, for instance having a depth in the order of 0.1 mm, and preferably being irregularly shaped and/or limited in length and/or at an acute angle to the longitudinal direction of the profile body.

[0022] Preferably the second wall is provided with longitudinal grooves, optionally the lower or inner side of the second longitudinal strip as well.

[0023] In a further development of the system according to the invention the first longitudinal strip at the location of the attachment holes has a lower or inner surface that is in one plane with the lower or inner surface of the second wall, due to which flat abutment and as a result transfer of forces at the location of said holes is enhanced. Alternatively the first longitudinal strip at the location of the attachment holes may be provided with protrusions for spacing it from the surface of the second wall, which is advantageous in case of a higher position of the first longitudinal strip with respect to the lower or inner surface of the second wall.

[0024] In a further aspect, the invention provides a profile body suitable and intended for a cover profile system according to the invention.

[0025] Although flat or panel-shaped profiles are described herein as detailed embodiments of the invention, it will be apparent to those skilled in this art that the profiles or sections can have other shapes.

[0026] Preferably the profile body is formed through extrusion from a composite material of a thermoplastic polymer containing cellulose fibres. The content of cellulose fibres preferably is more than 50 % by weight, more preferably more than 70 % by weight, most preferably between 70-80 % by weight. Such material has the appearance of wood. In this way, the need for a layer that provides a wood-like appearance afterwards, as is often done in the manufacture of known synthetic siding profiles, can be dispensed with. This is particularly the case when the aforementioned texture is present on the top surface.

[0027] The strength and the wood-like appearance is further enhanced when the cellulose fibres comprise a quantity of relatively short, randomly oriented fibres, as well as a quantity of relatively long fibres that are oriented in profile direction, as described in applicant's International patent application PCT/NL95/0153 which is relied on and incorporated herein by reference, and corresponding to other products of the applicant that have been registered under the trade name Tech-Wood.

[0028] Preferably the short fibres have a length in the range of 0.2 - 2 mm and the long fibres have a length in the range of 2 -6 mm. The average length of the short fibbers is shorter than the average length of the long fibres.

[0029] The invention furthermore provides a profile system for forming a walking surface, roof surface, wall surface or wall, or the like, comprising a plurality of flat elongated hollow profile bodies, each comprising a first wall, a second wall, a first longitudinal edge and a second longitudinal edge, wherein the first longitudinal edge is provided with a first longitudinal strip having holes for attachment to a base surface. The second longitudinal edge is provided with an opening for accommodating an edge area of a first longitudinal strip of the adjacent profile, wherein one of either longitudinal edges is provided with a second longitudinal strip, which at the side of the first strip that faces the first wall, extends over the first strip to at least in abutment with an opposite longitudinal wall of the opposite longitudinal edge.

[0030] In a further aspect, the invention provides a cover profile system for forming a walking surface, roof surface, wall surface or wall, comprising a plurality of flat elongated hollow profile bodies, each comprising a first wall, a second wall, a first longitudinal edge and a second longitudinal edge, wherein the first longitudinal edge is provided with a first longitudinal

strip serving as a tongue and the second longitudinal edge is provided with an opening serving as a groove for accommodating an edge area of the first longitudinal strip of an adjacent profile. These profile bodies are formed through an extrusion process from a composite material of a thermoplastic polymer containing cellulose fibres. During the manufacturing process the hollow profile bodies acquire a woody look. As a result, such a system is an attractive alternative to the existing hollow aluminium and synthetic profiles.

[0031] In this case as well, it is preferred that the content of cellulose fibres – such as wood fibres or other cellulose containing particles - be more than 50 % by weight, more preferably more than 70 % by weight, most preferably between 70 and 80 % by weight, and/or that the cellulose fibres comprise a quantity of relatively short, randomly oriented fibres, as well as a quantity of relatively long fibres that are oriented in profile direction. The short fibres have a length in the order of 0.2 - 2 mm and the long fibres have a length in the order of 2 - 6 mm.

[0032] Preferably a plurality of partitions are formed between the first wall and the second wall for defining a plurality of longitudinal chambers, as a result of which the panel or profile made of wood/synthetic composite can be lightweight and strong.

[0033] In all above-described embodiments, the thermoplastic polymer used can be a polyolefin, such as polypropylene or polyethylene, or polyvinylchloride or polyamide.

[0034] In a still further aspect, the present invention provides a floor, roof or wall constructed using a cover profile system as described herein.

Brief Description of the Drawings

[0035] The present invention will be illustrated on the basis of an exemplary embodiment shown in the attached drawings, in which:

[0036] Figure 1 shows a symmetrical perspective view of a hollow profile part or profile member or panel according to the invention;

[0037] Figure 2 shows a top view of a portion of the profile part of Figure 1;

[0038] Figures 3A and 3B show details in cross-section at the location of both longitudinal edges of the profile part according to Figures 1 and 2;

[0039] Figure 4 is a cross-section view and shows two profile parts according to Figure 1, joined together and placed on a base;

[0040] Figure 4A shows an enlarged detailed sectional view IVA of Figure 4;

[0041] Figure 5 is a cross-section view and shows two profile parts in an alternative embodiment, in joined condition;

[0042] Figure 5A is a cross-section view and shows an edge detail of the alternative embodiment of the profile part according to Figure 5; and

[0043] Figures 6 and 7 are cross-section views and show cross-profiles of a first and a second other embodiment, respectively, of a profile part according to the invention.

Detailed Description of Invention

[0044] The profile part or profile member 1 is shown in Figure 1 and further, is manufactured by an extrusion or pushtrusion process in direction S, and is formed from a composite material, comprising a matrix of synthetic thermoplastic polymer, particularly a polyolefin, preferably polypropylene, including a plurality of, for instance 70 % by weight or more, of a mixture of short wood fibres and long wood fibres, wherein the short wood fibres have a length in the range of 0.2-2 mm and the long fibres are in the range of 2-6 mm. In a manner as for instance described in International patent application PCT/NL95/00153, the long fibres V during manufacturing have been oriented substantially in direction S, whereas the short fibres are randomly oriented. During production of the profile part 1, use is made of dried wood fibre material that contains a few percent moisture, in one embodiment less than approximately 1, % by weight of moisture.

[0045] The profile part 1 has an upper wall 2 and a lower wall 3, having a top surface 2a and a lower surface 3a, respectively. At the longitudinal wall 8, in the first longitudinal edge 4, a first longitudinal strip 11 having a tongue 13 (see Figure 3A) has been formed, and at the opposite second longitudinal edge 5 a groove 30 for the tongue 13 has been formed, see Figure 3B.

[0046] Between the longitudinal edges 4 and 5 and the upper wall 2 and lower wall 3 partitions 16 have been integrally formed, thus defining longitudinal chambers 6, 6a and 6b.

[0047] As can be seen in Figure 2, the top surface 2a has a series of parallel grooves 20 which extend in the longitudinal direction and which have a depth of, for instance, 1 mm. The surface in between and adjacent to the parallel grooves 20 is provided with finer grooves 21, which, for instance, have a depth of 0.1 mm and provide the surface 2a with a wood grain-like

look. This fine texture is also present on pendent wall member 8a that is a part of the longitudinal wall 8, (Figure 3A) on the first longitudinal edge 4, and also on the wall member 38 and on the top surface of the second longitudinal strip 36 (see Figure 3B) at the second longitudinal edge 5. In fact all surfaces that are visible in use are thus provided with a fine wood grain texture.

[0048] As can be seen in Figure 2 and Figure 3A the tongue 13 or the first longitudinal strip 11 is provided with one or more continuous holes 10, intended for an attachment means such as a screw or a nail 90 (Figure 4). The first longitudinal strip 11 is lip-shaped and buckled, having a portion 12 positioned lower and a tongue or end portion 13 that is positioned higher than portion 12 and recessed. At the lower side in the end portion 13 which in fact is the end edge as well, a shoulder 14 extending in longitudinal direction is formed, and at the upper side a shoulder 15 extending in longitudinal direction is formed, which over a distance Δ considered in the horizontal direction is recessed with respect to the shoulder 14.

[0049] In this example shown in Figure 3A, the above-mentioned wall member 8 is not continued into the lower wall 3 but ends at a distance below the pendant wall member 8a in order to form an opening or slit 7 extending in the longitudinal direction, which opening or slit is bounded in the downwards direction by a raised edge 9 formed in the lower wall 3, at the location of the beginning of the first longitudinal strip 11. The first longitudinal strip 11 as it were protrudes from the longitudinal wall 8 formed at the first longitudinal edge 4.

[0050] The second longitudinal edge 5, shown in Figure 3B, has a groove 30, which at the lower side is defined by a lowermost groove wall 31 which is in one plane with the rest of the lower wall 3, and an uppermost groove wall 32, which continues beyond the pendent wall member 38 in

order to form the protruding second longitudinal strip 36. The upper corner of the groove wall 31 forms a stop edge 33 which is described herein below.

[0051] The joining of both longitudinal edges 4 and 5 takes place, as schematically shown in Figure 4A, by inserting the second longitudinal strip 36 of a first profile part into the slit 7 of an adjacent second profile part in the direction A. Simultaneously, the portion 13 of the second profile part is inserted into the groove 30 of the first profile part in the direction B. This inserting action continues until the shoulder 14 of the second profile part abuts the stop edge 33 of the first profile part. The top surface 17 of the second profile's longitudinal edge again abuts the bottom surface of the groove wall 32, so that when exerting normal forces the limit is reached for joining, whereby the forming of the channel 81 having the indicated width is accomplished. The second longitudinal strip 36 as it were extends up to or in this case beyond a imaginary plane T through the location where the strip 11 begins to project from the longitudinal wall 8, which is perpendicular to the lower wall 3. As a result the area above the first longitudinal strip 11 is shielded. This shielding is enhanced because the strip 36 lies on the upper edge of raised edge 9. The top surface of the strip 36 keeps the slit open to the lower edge of pendent wall member 8a.

[0052] In fact a double tongue and groove connection with a possibility of expanding and which is operative in two directions is provided with on the one hand the longitudinal strip 11, particularly strip portion 13, and with groove 30, and on the other hand with the second longitudinal strip 36 and with the slit 7. As can be seen in Figures 4 and 4A, in assembled condition, situated on, for instance, a wooden undersurface 60, there results the shielding of the space 50 situated immediately above the attachment holes 10. The attachment means 90 are shielded as a result, whereas also moisture, such as water falling in the direction D, cannot end up in said space 50 and thus in the holes 10, and therefore not on the structure 60. On

the contrary, the water is received on the second longitudinal strip 36, which forms the bottom of channel 81 formed by aforementioned wall members 8 and 38. The water is able to flow away in the longitudinal direction, in direction E in said channel. Should the water inadvertently pass through the slit 7 into the longitudinal chamber 6a, then discharge in direction E can also take place from there.

[0053] Under normal conditions the recessed position with respect to each other of the shoulders 14 and 15 cooperates in the prevention of further insertion of the raised lip portion 13 into the groove 30.

[0054] In case of much larger forces occurring under the influence of expansion processes (among others, thermal expansion or expansion caused by absorption of water by the relatively dry wood fibres), a deformation possibility is created because the wall 32 is able to deform slightly in direction C. This permits the shoulder to move along the abutment edge 33, and the strip portion 13 that is positioned higher, is able to enter further into the groove 30.

[0055] Also at the other side an expansion possibility is provided, due to accommodation of the second longitudinal strip 36 in the opening 7, wherein the lower surface of the strip 36 is slidably positioned on the upper edge of raised edge 9.

[0056] Due to the long fibres oriented in the longitudinal direction of the profile part 1 the expansion -in particular as a result of the absorption of moisture in the fibres after the cover profiles have been exposed to the outside air for some time - per unit of length in the longitudinal direction is considerably lower (for instance twice as low) than the expansion in transverse direction. The above-discussed interconnection of the profile parts permits this expansion without particular deformation.

[0057] As can be seen in the Figures 3A, 4 and 4A the bottom surface 3a is provided with longitudinal grooves 22.

[0058] The panels or profile parts 1 of the Figures 1-4A are particularly suitable to be used as floor boards, for instance on balconies, but also on jetties or wooden platforms, wherein the underlying structure is shielded. The profile provides the advantage that it does not splinter, which makes its tread surface easily accessible for bare feet.

[0059] In Figures 5 and 5A an alternative form of the first longitudinal edge 4 is shown, wherein the slit 7' is bounded by a continuation of wall 8', in this case horizontally inwardly turned wall member 8'a and vertically turned wall member 8'b that merges into bottom wall 3. The wall members 8a,b together with bottom wall 3 form a first longitudinal chamber 6a', which is much smaller than first longitudinal chamber 6a of the embodiment of Figure 1.

[0060] In the joined situation shown in Figure 5A, the second longitudinal strip 36 extends into the slit 7', wherein the lower surface lies slidably on the raised edge 9' and the end edge thereof is at a short distance from wall member 8'b.

[0061] In Figures 6 and 7 profile parts are shown in mating engagement that are particularly suitable for use as siding parts, in particular in wall surfaces, or wall panels.

[0062] The profile parts 100 and 200 are made of the same material as profile part 1. They have an upper wall 102, 202 and an inner wall 103, 203, a first longitudinal edge 104, 204 and a second longitudinal edge 105, 205, in between which longitudinal chambers 106, 206 have been defined.

[0063] The first longitudinal edge 104, 204 is provided with a first longitudinal strip 111, 211, having raised end lip 113, 213, which at the lower or inner side is provided with a shoulder 114, 214. In the longitudinal edge 111, 211 attachment holes 110, 210 have been made for nails and screws and the like, and namely in the portions 112, 212 thereof, which however are situated at a distance above the lower surface 103A, 203A, raised by means of, for example, longitudinal legs 117, which have been provided with support surfaces 119, 219 for abutment against an undersurface.

[0064] The second longitudinal edges 105, 205 have been provided with a short, with respect to the end lip 113, 213, broadened groove 130, 230, downwardly or inwardly bounded by groove wall 132, 232 and upwardly bounded by second longitudinal strip 136, 236.

[0065] In this case the first longitudinal edge 104, 204 is not provided with a slit, as is the case indeed in the embodiment of the preceding figures. Instead the outer wall 102, 202 is extended with the second longitudinal strip 136, 236, which also forms a continuation of the uppermost groove wall, and at the end is provided with a downward stop 134, 234, as a result of which a substantially sealing stop against the top surface 102a, 202a of the adjacent profile part 100, 200 is obtained.